

Local Operating Procedure (LOP)

Site	Monkmoor STF
Title	Leak Detection and Repair Plan (LDAR)

Purpose	This Local operating procedure describes the methods applied to locating, identifying and mitigating against fugitive emissions to air as part of the Environmental Permitting Regulations requirements. As well as protecting the environment the benefits of this plan include the safety protection of site staff and increased productivity of the process.
Who	Site operators and managers at Monkmoor

Must Have (H&S, Quality, Quantity, Environment, Training, Resources)

Enter the main must haves before the requirements of this LOP are carried out, e.g must have a Blue Card; Must be trained in..... If none required, then just add 'N/A'

- Understanding of Gas Detection and Risks.
- Understanding of Environmental Permit requirements.
- Appropriate training in Personal Gas Monitor and DSEAR awareness.

Remember – 'Stop, Think, Take 20'

Summary Must Do

Enter here no more than 10 key points / requirements of this LOP..... If none required, then just add 'N/A'

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| 1. Check Environmental Permit requirements. | 6. Close out corrective actions. |
| 2. Refer to Site Plan for location of assets in scope. | 7. |
| 3. Understand detection and reporting processes. | 8. |
| 4. Understand Schedule 5 notification process. | |
| 5. Maintain records. | |

LOP

1. Scope

This Local Operating Procedure is applicable to Monkmoor Anaerobic Digestion (AD) site, which produces biogas for consumption in the Combined Heat and Power (CHP) engines and generate a source of electricity. It details the maintenance requirements to identify fugitive biogas emissions from seals, flanges, valves, pumps, pipework and tanks.

Note – Emissions of sludge to the environment are minimal due to site surfacing and regular operator site tour inspections therefore not included in this plan.

2. Responsibility

The Bioresources Manager for the AD site is responsible for ensuring environmental permit conditions are complied with. The Maintenance Team are responsible for undertaking the monitoring and reporting any defects for repair.

3. Asset Monitoring Schedule

The following assets in Table 1 are scheduled for routine proactive inspection by thermal imaging camera on a 12 monthly basis. This asset list is based on the potential for biogas leakage at each specific location.

The below assets are also monitored daily as part of the operator's daily site duties who are wearing methane detective personal gas monitors which whilst not identifying individual assets on a schedule use human senses and monitors to detect leakage which are reported centrally, and a work order raised for repair by the appropriately skilled operatives. We carry out Bi-annual checks on our Digester asset base via an external sub-contractor (Mott Mcdonald) and they issue a report and recommendations for the asset.

If the source of the emission is unknown during the daily duties monitor and human senses, then the use of Optical Gas Imaging will be requested to attend site and undertake an assessment to locate the source.

Table 1: Assets in scope

Asset	Method of Monitoring	Frequency	Priority	Priority Rationale
Digestors	Gas thermographic camera, Personal gas monitors	Monitors daily and camera 12 monthly	High	Volume of contained gas and level detection
Flare Stack	Gas thermographic camera, Personal gas monitors, Annual inspection	Monitors daily, Thermal imaging camera and external inspections 12 monthly	Medium	Frequency of use for emergency use or excess gas production
CHP Engines	Gas thermographic camera, Personal gas monitors, Hours run servicing	Monitors daily, Thermal imaging camera 12 monthly, Hours run inspection (Service)	High	Frequency of use and volume of gas
Boilers	Gas thermographic camera, Personal & fixed gas monitors	Monitors personal and fixed daily and camera 12 monthly	Medium	Dependant on fuel source and housed in building
Gas Booster Compressors	Gas thermographic camera, Personal gas monitors	Monitors daily and camera 12 monthly	Medium	Differing gas pressures
Gas Bags	Gas thermographic camera, Personal & fixed gas monitors	Monitors personal and fixed daily and camera 12 monthly	High	Contained gas volume
Emergency shut off Valve	Gas thermographic camera, Personal gas monitors	Monitors daily and camera 12 monthly	Medium	Operation and Maintenance task
Pressure Relief Valve (PRV)	Gas thermographic camera, Personal gas monitors	Monitors daily and camera 12 monthly	Medium	Operation and Maintenance task
General Gas Pipework	Gas thermographic camera, Personal gas monitors	Monitors daily and camera 12 monthly – visual checks	Medium	Gas volume contained – Look for degradation of pipework

General Gas Valves	Gas thermographic camera, Personal gas monitors	Monitors daily and camera 12 monthly – visual checks	Medium	Operation and Maintenance task
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4. Identifying assets

The above assets are all uniquely identified with ID numbers therefore are easily identifiable by the person undertaking the leak detection monitoring. This enables the assets to be scheduled for inspection and identified for repair if necessary. All new or replacement assets go through an asset tagging process to ensure an accurate site list is maintained within SAP. The use of diaphragm pumps and valves are used wherever possible so as to reduce the likelihood of leaks from the system.

5. Monitoring

The sequence of events when monitoring assets on site are outlined in training guidance for use of the Thermographic Gas Camera. The personal gas monitor is used in line with the training requirements outlined via our external 'Gas Monitor Training' carried out by an external certified contractor to STW.

6. Leak Repair

On detection of a gas leak the monitoring operative will inform the Site Manager/Senior Tech via a call and email and will raise the risk as an action hazard on our safety net system. The site manager will raise a job for the Maintenance teams to attend the leak for repair and an audit trail is available via our planning tool. The Environment Agency will be informed, if applicable, through the Schedule 5 notification procedure.

7. Recordkeeping

All gas assets are uniquely identified and an electronic site register is available and kept up to date (SAP). Leak detection is scheduled to the appropriately trained person using the site asset list via the MAMS system. Following inspection an electronic record is made of the checks undertaken and any follow up work required which will be scheduled to the appropriate person. Any work which is not undertaken in the predetermined time dependant on priority will be highlighted as being overdue and scheduled at the next available opportunity.

8. Type & Quantity of Emission

All combusted biogas is emitted to air via a point source emission point directly from the combustion unit therefore any likely fugitive emission will be of non-combusted biogas as this accounts for most of the stored gas with a composition of Methane (60-70%) and Hydrogen Sulphide (50-<100ppm). The quantity emitted will be variable dependant on:

- the location of the emission source i.e., a hole in a gas storage vessel has the potential to release a large quantity in comparison to an isolated pipework length,
- when the leakage was detected,
- the pressure of the contained gas.

9. Key Personnel

Responsibilities for implementation of the LDAR plan are outlined in Section 2. A more detailed list is shown in the below table.

Table 2: Key Personnel

Title	Responsibility
Bio-resources Manager/Senior Tech	Ensuring the LDAR is implemented, and site and repairs are carried out in timely manner by onsite maintenance team. Responsible for reporting issues to appropriate authorities.
Site Operators	Operation of site assets, detection and reporting of leakage if discovered whilst carrying out site duties.
Thermographic Engineer	Undertake site-based leakage monitoring and raising any leaks to site management team.

10. Reactive Leakage Detection Process

Reactive requests to monitor for biogas emissions are also directed to the team for example when new assets are installed, and leakage checks are required before putting back into operation. The same processes as above are followed for monitoring and escalation.

11. Training & Calibration

Personnel involved in undertaking leak detection using specific equipment are trained in the use of that equipment and all relevant Health & Safety requirements e.g., DSEAR awareness before attending sites. Equipment such as the thermal imaging camera are calibrated as per the manufacturer's recommendations.

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Process Map

Basic process mapping shapes have been included below but please review the Process Mapping Standard and H2 in Waterpedia for further guidance..... If none required, then just add 'N/A'

N/A

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Records, Appendices & References
N/A

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1.0	18/05/22	Joanne Chapman	Simon Farris	First Issue	N/A	Bioresources Ops
Summary of changes						
1.0	Document Created for IED permit application					
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